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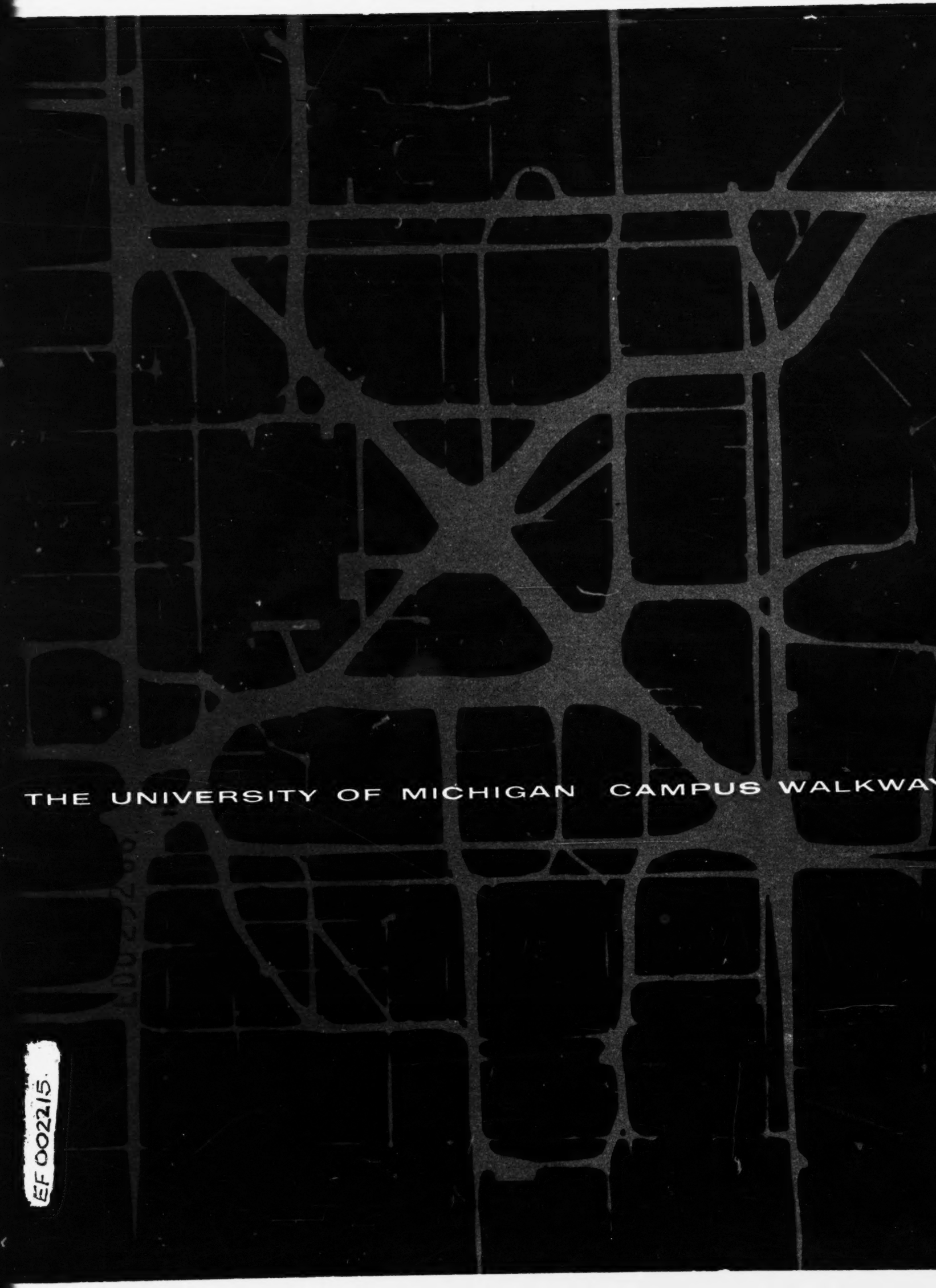
Walkway development throughout the various campus areas of the university is outlined with respect to the desired character of walkways, the minimum standards of certain walkway configuration, and long-range goals for an overall campus walkway system. Needs are discussed for the campus walkway pattern and special considerations are given for each of several general campus areas. The guidelines for walkway development include such areas as--(1) walk layout, (2) walk materials, (3) walk intersections, and (4) service drives and streets. Associated features are given as furniture, signs, lighting, and bicycles. Graphics are used to support discussion, including suggestions for technical details. (MM)



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THE UNIVERSITY OF MICHIGAN CAMPUS WALKWAYS

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Johnson, Johnson & Roy/inc. *landscape architects*

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This report is aimed at establishing a guide to walkway development throughout the various campus areas of the University. It is meant to be a general reference to communicate the desired character of walkways, the minimum standards of certain walkway configurations and some long range goals.

As pointed out in the Central Campus Study of 1963, The University of Michigan has a significant opportunity to build walkways into a major cohesive factor throughout the multiple campus areas. Any walk widening or new installation should be carefully done so that it can be an additive towards more unified walkway patterns. The recommendations outlined herein allow for local walkway conditions to vary according to the needs of individual building projects. Such variations should be welcome as long as the spirit of the general design remains consistently in accord with these guidelines.

The document composes into two basic portions, **Needs** and **Guidelines.** The first portion describes in brief the four general campus areas coming under this study and outlines the walkway needs in each area. The "Guidelines" section considers the various factors involved in the design of walkways throughout all the campus areas. Typical situations are illustrated in an attempt to clarify the intentions.

POTENTIALLY PREDOMINANT WALKWAY DEMANDS

THE UNIVERSITY OF MICHIGAN

NEEDS

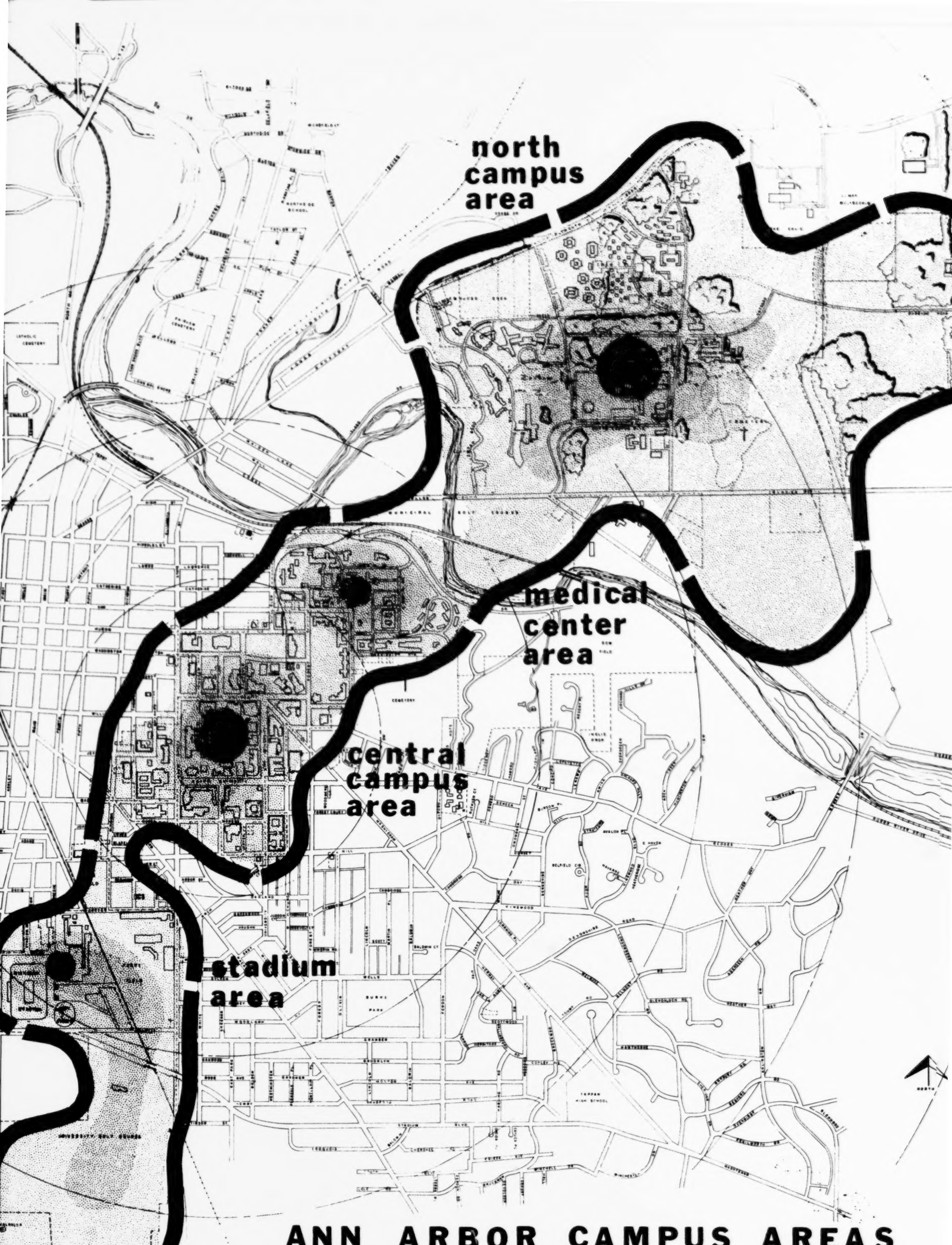
The alignment of walkways on any campus is at best a carefully considered prediction that they will satisfy the directional movement wishes of the major portion of the student body. To avoid the element of risk, a campus would be marked by either of the two extremes, no walks at all or a completely paved campus surface. Therefore, the success of any walkway pattern becomes a factor of a careful averaging of all walking needs towards satisfying the predominant volume flow directions.

Even the determination of a walkway width is a matter of coming to a practical balance between the surges of high volume need and the predominant low volume time. In an ideal sense, walkways simply cannot satisfy every directional desire of a student body nor adequately accommodate the surges of special events.

However, a walkway pattern should have certain desirable characteristics. In general, these are:

1. **Lead directly without deviation in direction from origin to destination points.**
2. **Flow smoothly without abrupt changes in direction or obstacles in path.**
3. **Allow for efficient maintenance methods.**
4. **Be safe enough to walk upon in all weather conditions.**
5. **Be broad enough to accommodate nominal surges of high volume foot traffic.**
6. **Be a clear and recognizable system throughout campus towards more efficient pedestrian movement, economy of materials and campus unity.**
7. **Should consider future construction in its layout alignment.**
8. **Accommodate bicycles on certain portions of walkways as well as bicycle parking at certain points.**
9. **Be sufficiently wide and of proper construction to accommodate service vehicles, eliminating the need for a separate service drive system.**

Following is a description of four major campus areas and a summary of needs in each area.



ANN ARBOR CAMPUS AREAS

THE UNIVERSITY OF MICHIGAN

Central Campus. The walks in the central campus area are largely determined by Ann Arbor's grid street system and some interior block quadrangle-like developments of the earlier campus. Although walks along the street are a significant contribution to walkway needs, the predominant patterns on Central Campus are the diagonal walks radiating out from the central library plaza. These radiating walks are intertwined with some minor walks satisfying a direct door-to-door route. All of this is interwoven with the somewhat rectangular pattern of the formal mall leading to the Rackham Building. This ground pattern of various walkway routes has developed bit by bit over the years and appears at first glance to be an arbitrary hodge-podge of criss-crossing walks.

Looking forward to the walkway demands of proposed buildings in the Central Campus area, special problems seem to be:

1. Expanding the width of existing walks.
2. Inserting new walkway routes into the existing pattern.
3. Resolving complex intersections towards avoiding patchwork appearance and worn-out grass areas.
4. Combining walkways, parking lots, service drives and bicycle routes.

The major walkway routes are indicated on the map. These should be broad 12 to 20 foot walks, sometimes accommodating bicycles and bicycle parking, sometimes blending into even larger plaza-like areas where many walkway intersections occur and occasionally even becoming part of the ground story of buildings in the way of walk-throughs or arcades. The major walks could advantageously be identified by a particular walk name, complete with marker and directional indication at some major intersections. Directional signs and a campus map should be introduced for a student to orient himself to his campus location. Also at this point, telephone booths, advertising kiosks and frames for student announcements should be considered.

Stadium Area. Southwest of the Central Campus area are located the major recreational facilities of the University. The Intramural Building and intramural fields, golf course, stadium, University Events Building, Yost Field House and tennis courts are all concentrated in this zone. Also in this area is a growing complex of University plant and administrative service facilities.

In the past, only special athletic events called for foot traffic between the central campus areas and the athletic area. But now with the new University Events Building and the build-up of the services complex, there is a growing need to include this area into the general planning considerations of a walkway system. In nearly every instance the existing walkways occur on the city streets. The streets, being in a rectangular grid pattern, have not allowed any truly direct routes to be considered. However, there may be some emerging opportunities for some cross-block short cuts connecting the athletic areas more directly with the central campus and giving a greater sense of unity between the two zones.

Special problems in the area are the proper accommodation of great volumes of pedestrians during athletic events, the numerous dangerous automobile conflicts, and the safe crossing of the Ann Arbor Railroad right-of-way.

Medical Center. The Medical Center complex of buildings lies immediately adjacent to the northeast corner of Central Campus. At the present time there are a number of obstacles to a direct pedestrian route between the two campus areas, but it is contemplated that these obstacles will be overcome in the near future. For instance, the block in which the Dental School and the power plant are located is in the process of redevelopment and the ability to walk freely through this area will be greatly improved. It is also contemplated that pedestrian overpasses at Forest and Huron will be developed to overcome a dangerous automobile conflict. The future planning of uses in the Medical Center depends upon the extension of the existing corridor network, with the outdoor walkways becoming secondary in importance. However, they will continue to be needed for two prime purposes:

1. To accommodate arriving and departing patients, visitors, staff and students. This

walkway pattern will essentially occur between parking areas and building entrance points.

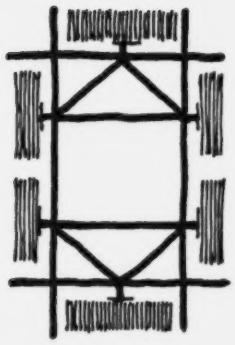
2. To provide for continued passive recreation needs. Walkways allow visitors, staff and certain patients to have the choice of stepping out of doors for a pleasant walk during good weather.

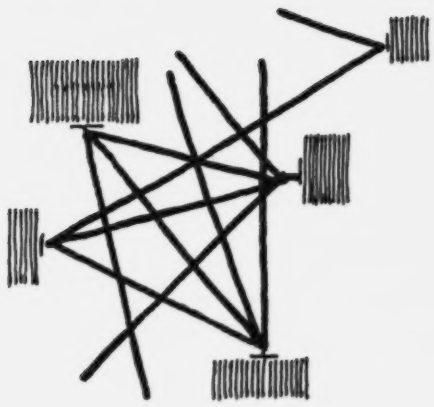
Another important aspect of walkways in the Medical Center area is the need to interconnect the Central Campus with the North Campus area. This will probably call for the walkways and bicycle routes to occur on the west, south, and east edges of the Medical Center area. Such walkways and bicycle routes must be carefully planned in accordance with the new Fuller Road improvement. Special problems are the steep banks on the north as well as the crossing of the river and the New York Central Railroad tracks.

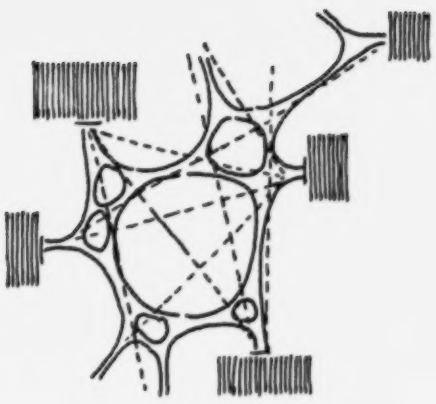
North Campus. Situated on the pleasant slopes and heights of the Huron River Valley is the North Campus area. The campus is already marked by several different types of walkways from the gently curving path type of walkway to the very intensive plaza type walking surfaces such as in the Science and Technology complex. Such a contrast of character is striking and effective if properly carried out. Fortunately, there is no commitment to a grid system of walkway patterns and the directions can easily take the pattern that the use demands. There will probably continue to be wide use of the pathway type of walk such as near the School of Music although such characteristics will probably be limited to campus zones near the river valley composed mainly of apartments and dormitories. In contrast to this character will be the demands for more plaza-like areas in the increasingly high density academic zone. It is here that the walkways are, at the moment, extremely difficult to predict as they may very well become part and parcel of building concepts such as arcades, underpasses, etc.

The longer range future may see the need for a bicycle/walkway crossing of the proposed Huron Parkway, possibly even an overpass to connect with proposed academic uses to the east of Huron Parkway.

GUIDE LINES







Walk Layout. Usually one of these three general layout concepts prevails in a unified campus walkway development program:

FORMAL. (Equal patterns on each side of a center line.) In the early phases of a formal campus plan the formal walk pattern which matches it is very direct and efficient. However as soon as new buildings fall outside of this formal plan it is nearly impossible to continue the formal walk pattern. (The example on campus of a formal pattern is the Ingalls Mall.)

POINT-TO-POINT GRID. Here the major destination points are located and straight lines drawn between each one. A walk is constructed exactly along that line. The difficulty with this very practical approach is that, 1) not all point-to-point desires warrant building a walk, and 2) undiscovered or new point-to-point desires keep emerging. At some point, short of paving the entire campus surface, one simply stops building walks. The result is often a patchwork appearance with awkward intersections and worn out grassed areas at shortcut points. (Central Quadrangle on campus.)

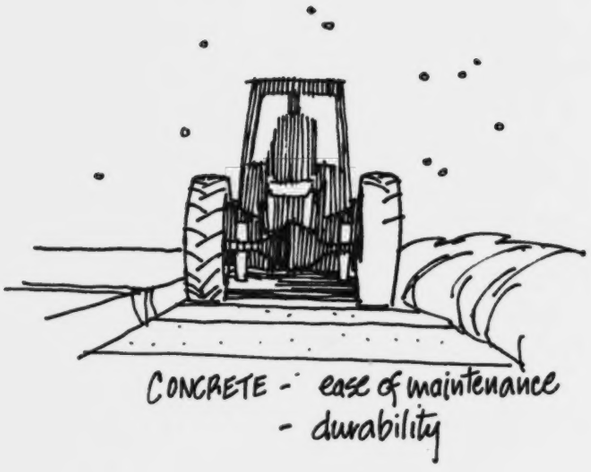
INFORMAL. This approach emerges out of a point-to-point desire analysis, but rather than build the walks in straight lines, one blends several similar directions into one average direction, assuming that slight deviation from a straight line does not alter one's sense of directness. The result is that a greater number of different destination desires can be satisfied. The physical characteristics which mark this pattern are gentle curves, broader intersections (which occasionally can become small plazas), large radii where walks intersect, and broader unbroken zones of grassed areas. The flexibility of this walk system can allow for certain obstacles (such as trees, walls, buildings) to be bypassed and can adjust to changing ideas on future building locations without detrimental effects on layout pattern. (A bit of this system has been installed on the Forest Avenue side of the new Museum addition.)

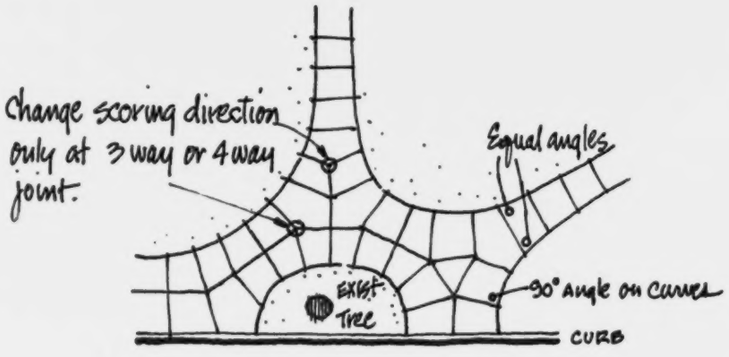
The University of Michigan can best take advantage of the informal approach to walk layout throughout Central Campus and North Campus as well as the connecting walkway routes.

Walk Materials

CONCRETE. The best all around walking surface for general public/student body use continues to be concrete. Most existing walks are concrete and the predominant material for the future should be concrete, whether the walks be formal or informal in layout.

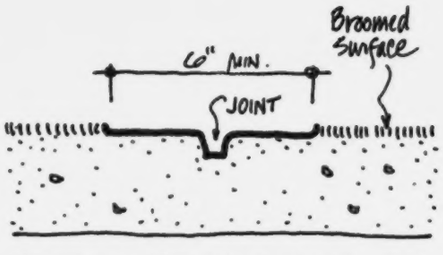
Special care should be taken in assuring the best standards of scoring and pointing techniques. This is especially true in view of the probability of more curving walk patterns in the future.





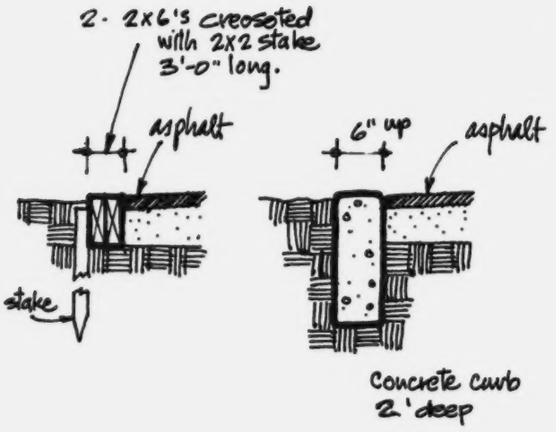
PLAN – TYPICAL SCORING FOR CURVING WALKS

Concrete can be given special character if the surface is brushed with a coarse broom before it sets, then smooth tooled at contraction and construction joints as well as at the edges of the walk to contrast with the course brooming. Another operation to give special effect is applying and exposing coarse stones (¼" - 1" in diameter) just before concrete sets. Both of these methods are more economical than brick or other special material. It should only be used when detailed finishes are appropriate, such as on plazas, special intersections, building entrances, etc.



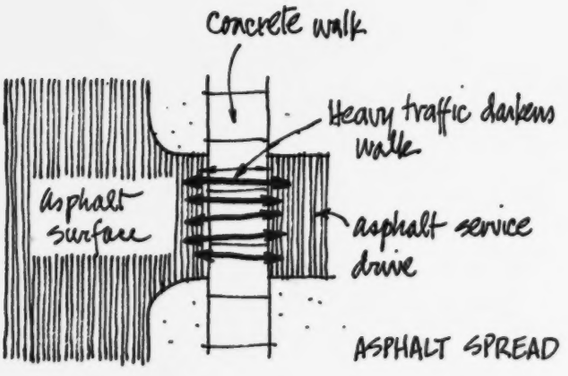
SECTION - BROOM SURFACE WITH SMOOTH TOOLED JOINT

SECTION - AGGREGATE SURFACE

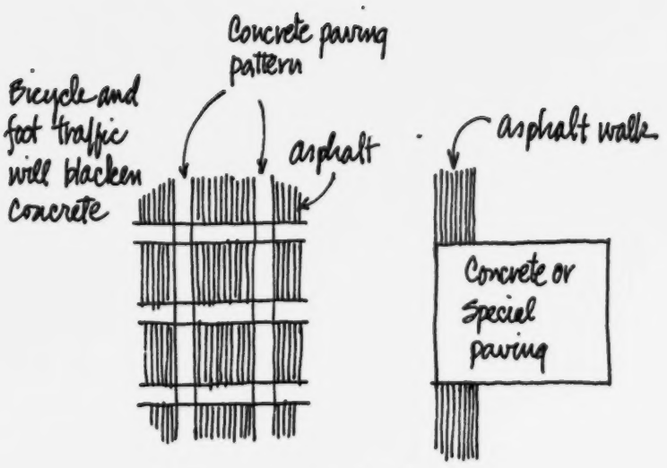


TWO EDGE DETAILS FOR ASPHALT WALKS

ASPHALT. The most practical material alternative to concrete surface is the asphalt surface. Its advantages are that the dark gray color blends with grass tones, it can closely resemble "pathway" type walks where the relationship is significant (woodland areas of North Campus, arboretum, etc.), in some cases it needs no special forming and it is generally more economical than concrete. However, two serious disadvantages limit its use for campus/community use: a) the edges of the walk when not permanently formed with another material, tend to ravel or crack off in small pieces and b) without constant use, an asphalt walk tends to "deaden" or dry out, bringing on cracking, a loosening of the stone aggregate and a need for resurfacing.



ASPHALT SPREAD



AVOID THIS USE OF ASPHALT

If asphalt can be given permanent edges of another material such as concrete curbs it would be an excellent companion to a concrete walk. (Costs would be comparative with concrete in this case.)

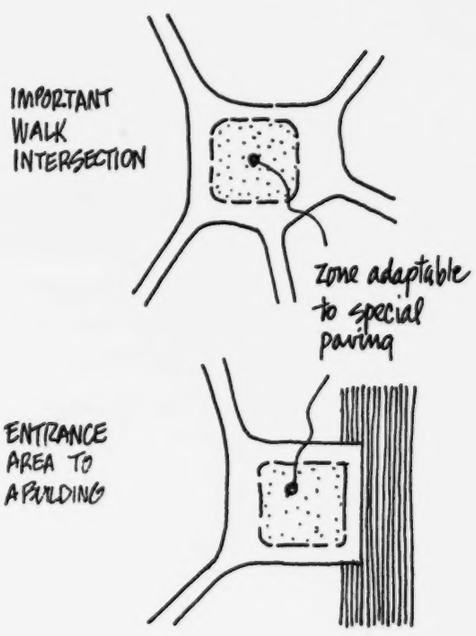
Appearance problems do arise however, when an asphalt walk meets a concrete or other such surface. The asphalt surface tends to "spread" or "track" across the lighter surfaces of concrete. This is especially true when the tires of autos, motorbikes or bicycles do the tracking.

It appears best to limit the use of asphalt to two circumstances: a) when a natural woodland effect would be in keeping with the area, where uneven edges would in fact be desirable and where the dark tone of the asphalt should especially blend into the environment rather than stand out in sharp contrast; b) as a temporary surface in areas where significant changes will occur in the near future.

In neither of the above circumstances would special edging be called for.

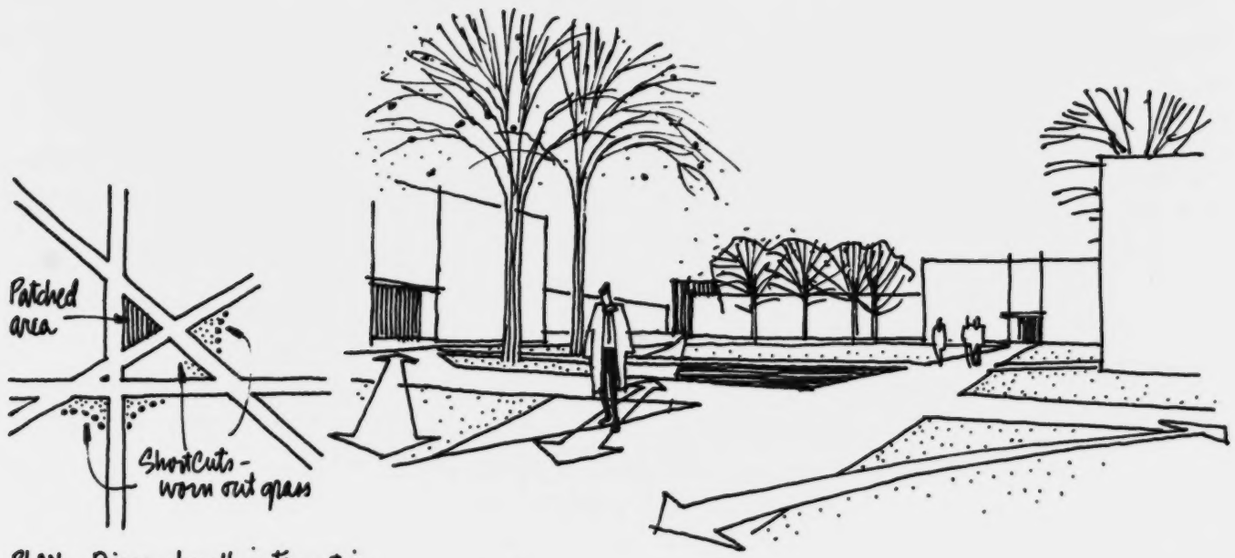
SPECIAL SURFACES. There are many instances where special surfaces would be desirable to emphasize that the walk has changed into a surface for a different purpose such as an entrance to a building, an important intersection of several walks, or an information point. These are areas where the steady flow of people on a walk shifts into slower moving eddys of direction changing, or pausing to check on a special event being advertised, or sitting on a bench. When only a few people are present, a special surface material in such an area can also cut down on the apparent expanse of an otherwise large concrete area.

Types of special surfaces include broomed or textured concrete, brick pavers, slate, asphalt blocks (square and hexagonal), granite blocks, and exposed aggregate paving. There is no need to be especially consistent in the choice of special surfaces on a campus-wide basis. However, there should be a strong relation to the materials in the immediate vicinity, such as the materials of a nearby building. As a general rule, a new material should not be introduced in relationship to those in the immediate vicinity. In nearly every case it is a special, custom design problem and should be taken up in detail as each area receives detailed development attention.

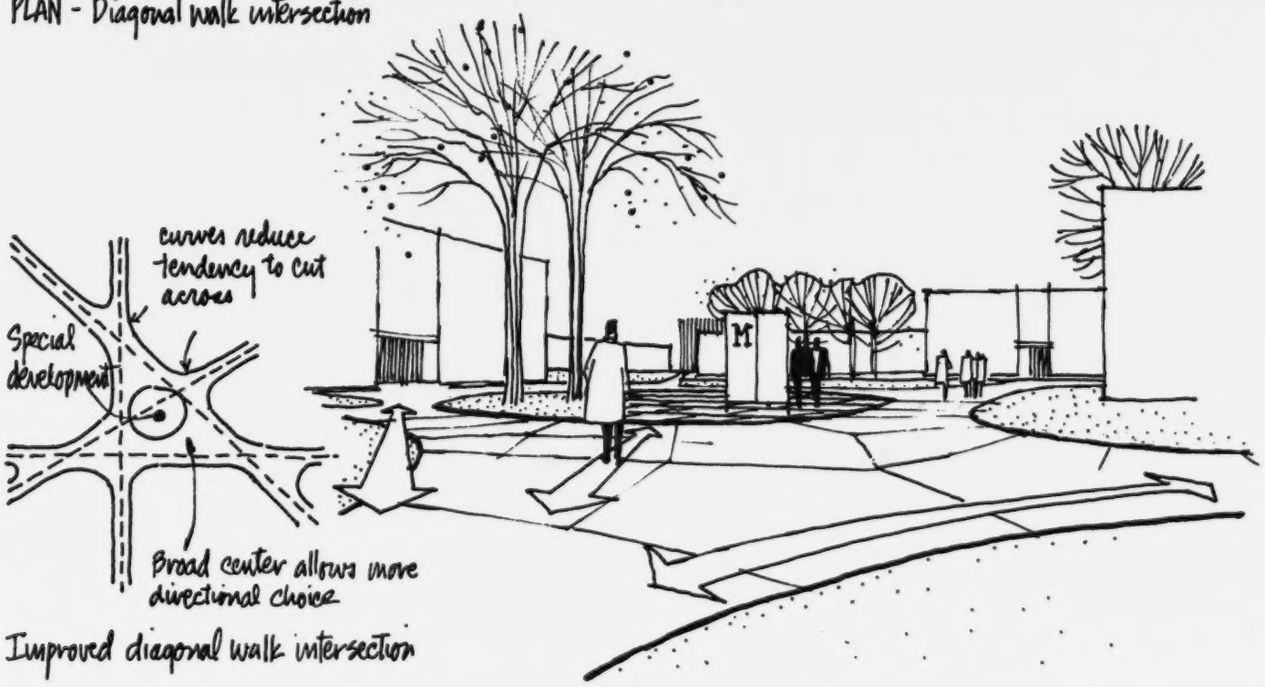


Walk Intersections

Diagonal walks often meet in complex and difficult intersections, resulting in small triangular areas of grass or asphalt patching. Shortcuts across corners wear out the grass in these areas also. A more satisfactory resolution of such an intersection is to pave a broader zone and introduce broad curves or radii at the intersecting angles (See sketch). To decrease the amount of concrete at such a broadened intersection a center portion can be paved with a special material and furnished with sign display panels or other information/directional devices. Another possibility is to install grass and trees in the center portion. Care should be taken however, to avoid making obstacles of such devices.

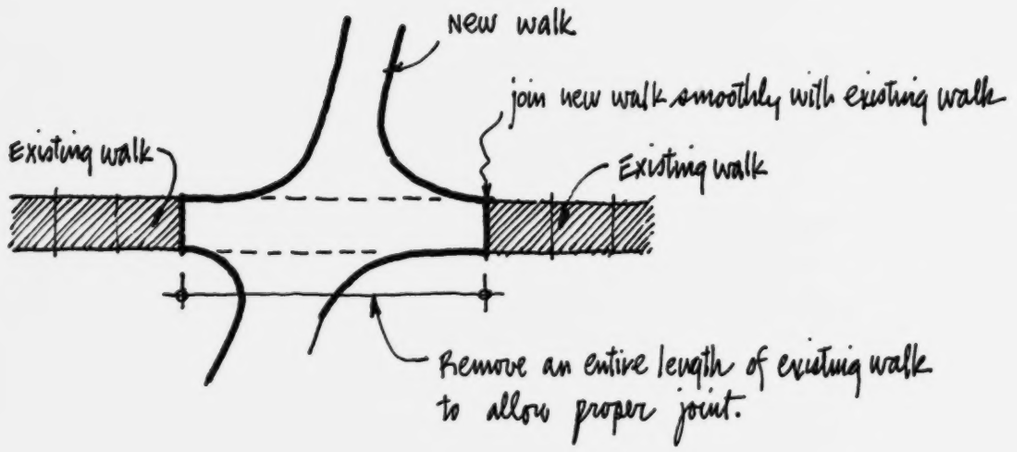


PLAN - Diagonal walk intersection

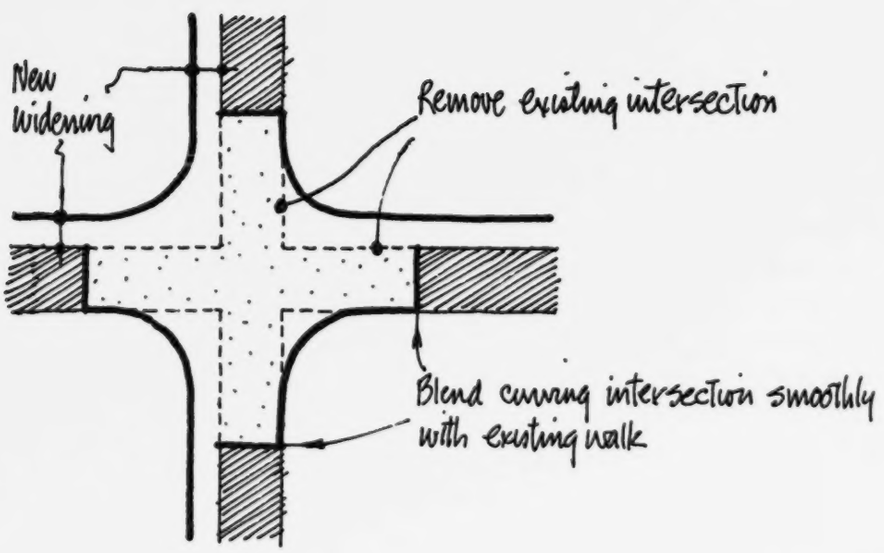


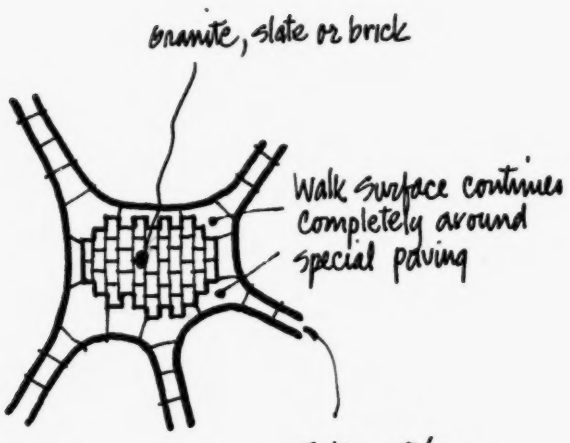
Improved diagonal walk intersection

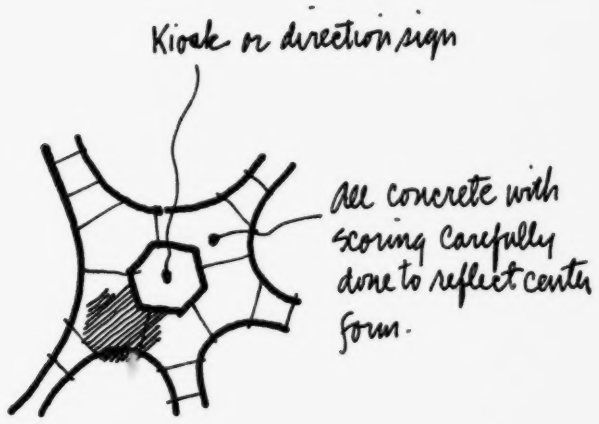
When a new broadened walk intersects with an existing walk a smooth, generous joint should occur. It is best if the existing walk is removed where this intersection is to occur in order to allow the proper joint to be constructed.

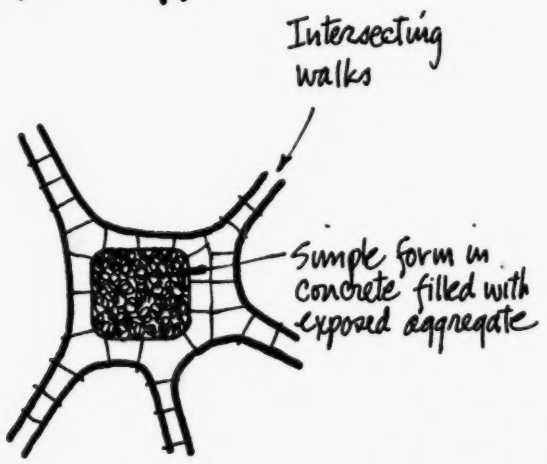

New walk
join new walk smoothly with existing walk
Existing walk
Existing walk
Remove an entire length of existing walk
to allow proper joint.

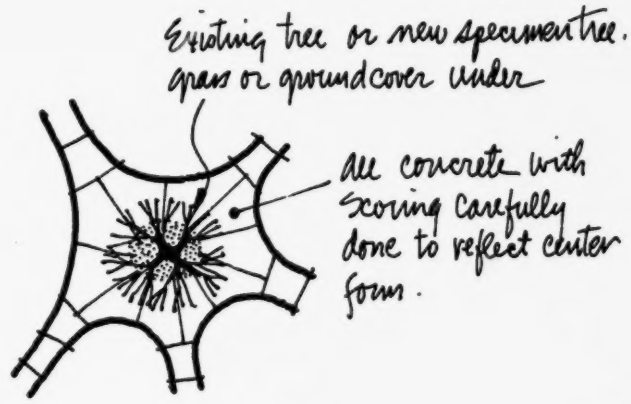
Where an existing intersection is broadened due to the widening of one or both of the walks it is best to remove the walks at the intersection to facilitate the proper blending of the widened portion of the walk.



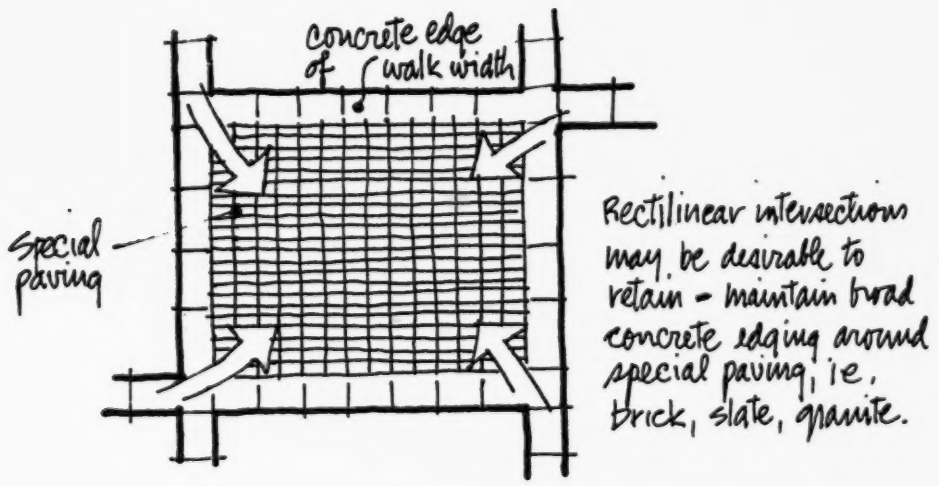






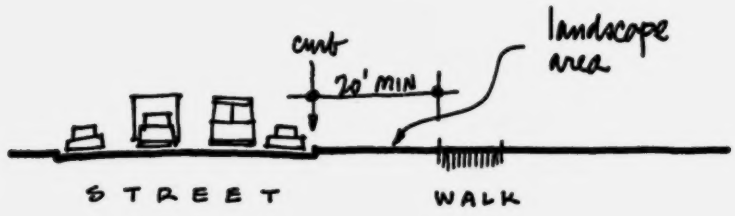

Existing tree or new specimen tree. grass or groundcover under
All concrete with scoring carefully done to reflect center form.

WHEN MULTIPLE INTERSECTIONS BECOME MINOR PLAZAS.


concrete edge of walk width
special paving
Rectilinear intersections may be desirable to retain - maintain broad concrete edging around special paving, ie, brick, slate, granite.

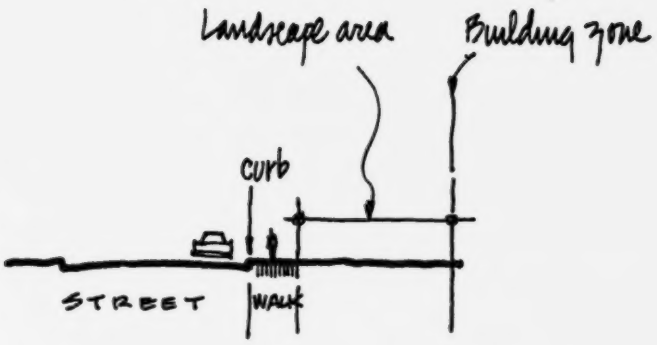
Service Drives and Streets

Generally service trucks need a direct access to buildings, but in most cases on the campus, service drives are also popular pedestrian routes. Wherever possible these service drives should be developed as heavy duty sidewalks. This helps to protect the character of the Campus as well as avoid the necessity of building curbs and gutters.

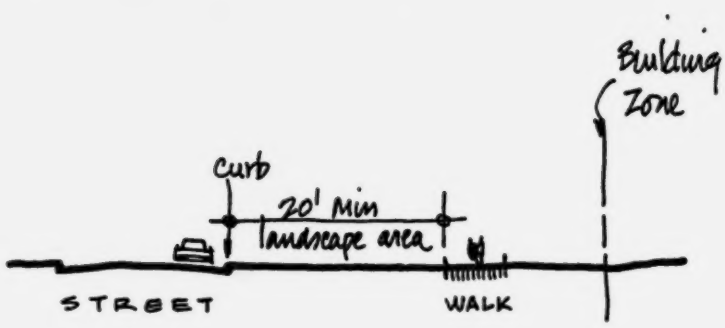


landscape area should occur between walks and streets with heavy traffic.

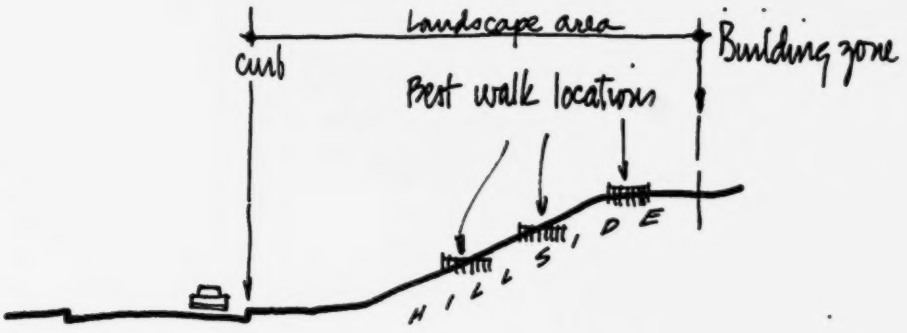
WALKS ALONG STREETS



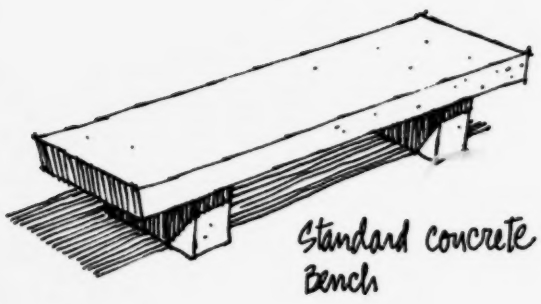
Normal walk location along street



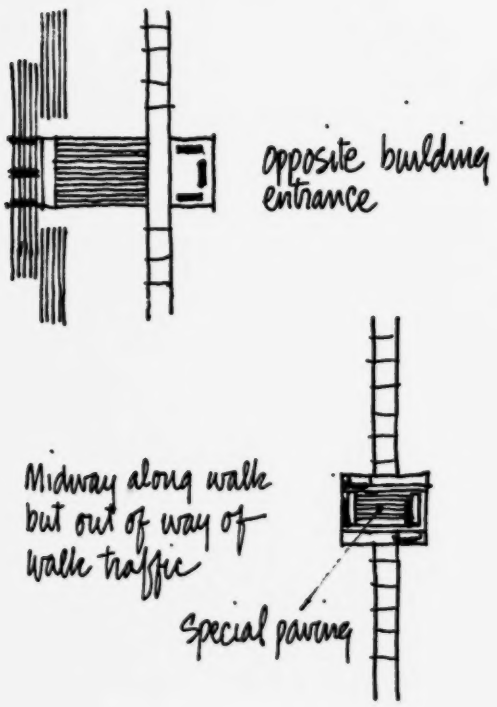
Pull walk away from street when minimum of 20' is available.

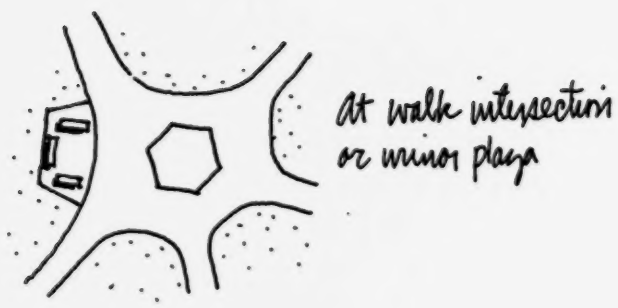


Pull walk away from street when hillside pushes building zone back.



LOCATIONS





The above locations for benches also apply to specially constructed seat-walls in place of benches.

Furniture

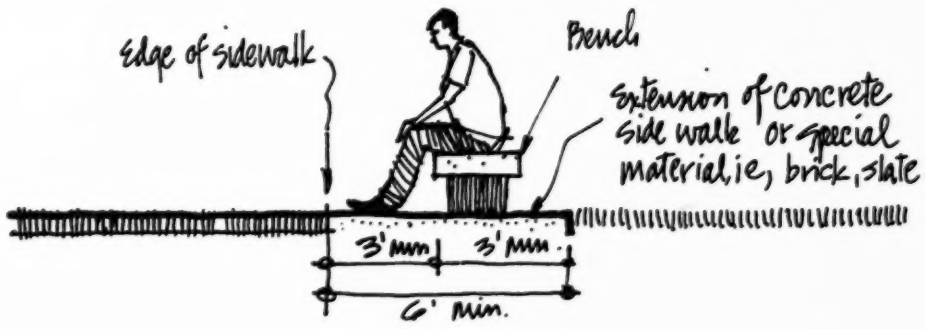
The standard concrete bench which has been in use for several years on campus has proved satisfactory from a utilitarian standpoint as well as from an appearance standpoint. Its good proportions and simplicity allow it to be used in nearly every possible campus situation.

This bench, as a general rule, should occur in multiples of two or more at the more significant points along the walkways; at major intersections, entrances to buildings, bicycle parking areas, etc. The scattering of single benches along a sidewalk should be avoided, but if it does occur, then two or three can be clustered at, say a midpoint along the walk between two major intersections. Here the walk should widen and the pavement could change to brick or broom-finish concrete to further emphasize the change in pace.

The bench should always occur on a level surface, even if a special notch must be constructed where a walk is on a slope.

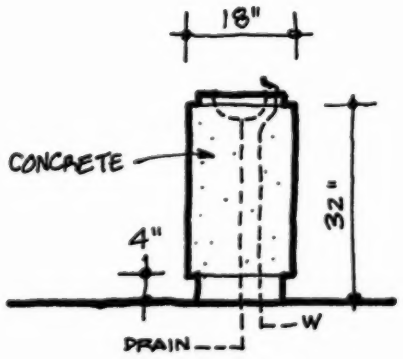
Bench arrangements should be in careful alignment with the walk or plaza layout in order to avoid a haphazard and chaotic appearance. Two benches at a right angle allow for the users to face each other for ease of conversation. Another basically good arrangement is a "U" shape.

It is important that the bench does not become an obstacle to the flow of pedestrian traffic. For this reason the front edge of the bench should be placed well away from the walk edge a minimum of 3′ to a preferable 5′ norm.

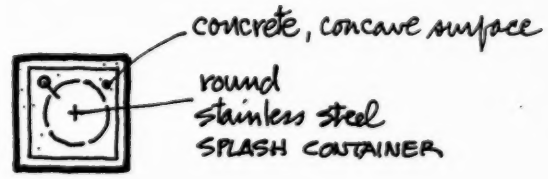


MINIMUM DIMENSION - BENCH FROM SIDEWALK

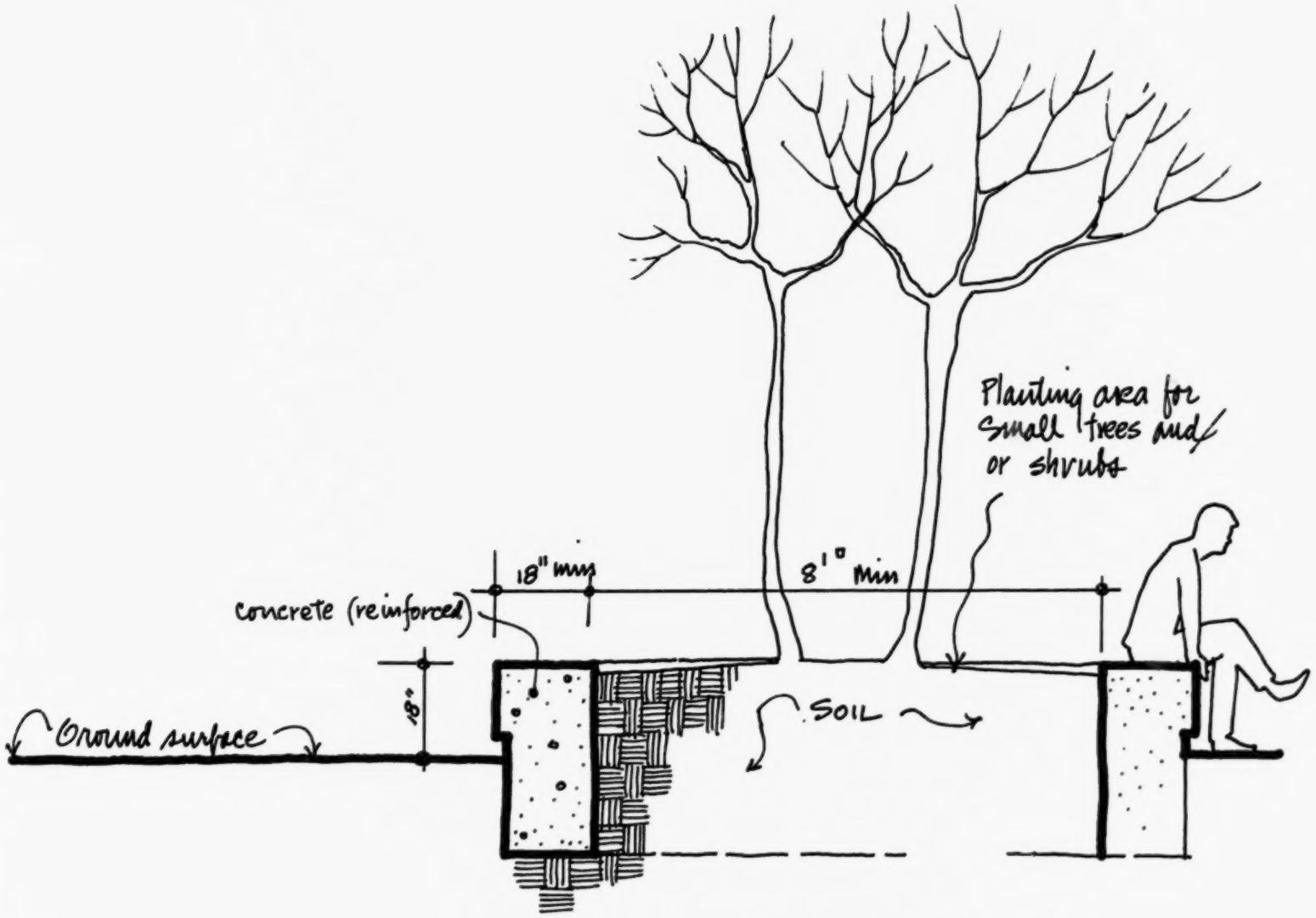
As a convenience to the pedestrian, drinking fountains could be introduced at half-a-dozen locations on Central Campus and eventually as many on North Campus. These could best occur at major walk intersections (in front of Main Library) and where walkways might in the future pass through building complexes (Physics and Astronomy building underpass). If a free standing drinking fountain were to occur, its design should be substantial, free of maintenance and simple in form. One possibility is shown in the sketch below.



DRINKING FOUNTAIN

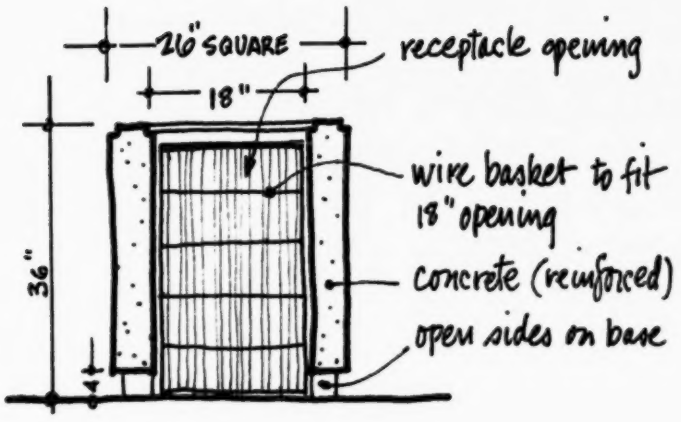


TOP VIEW



PERMANENT PLANTER

Occasionally a raised planting area can be used as an effective obstacle, screen, or feature as well as to allow for plants to occur where they otherwise might not grow, such as roof tops, large plazas, street edges, etc. (Due to the planting maintenance problem involved, plant containers should be avoided except where their unique mobility and potential color can be appropriately exploited.) The basic design standards for raised planters are indicated in sketch above.



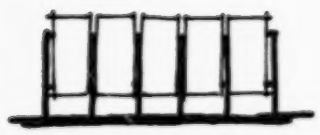
WASTE RECEPTACLE

For general campus cleanliness, a simple waste receptacle might be developed as indicated in the small sketch. It is a pre-cast concrete shell into which the receptacle itself is placed. The receptacle is removed, emptied and replaced. The intent here is to provide sturdy, well-proportioned bases for protecting the otherwise flimsy appearing metal or plastic types from being knocked over or removed from the premises.

Signs

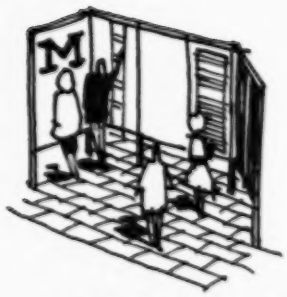
The need is evident for several types of signs along campus walkways. They fall into three basic categories:

PERMANENT SUPPORTS. Permanent supports are needed for official (University and student) announcements and basic campus information—maps, building names, etc. Several examples already exist on campus and efforts are being made to provide more of these units (see support at Michigan Union main entrance, the multi-faceted unit in front of the Main Library, and the kiosk at the main entrance to Hill Auditorium). These sign supports should allow for an ease of changing the announcement posters. Some should be specially lighted for night-time use.



SIGNBOARD

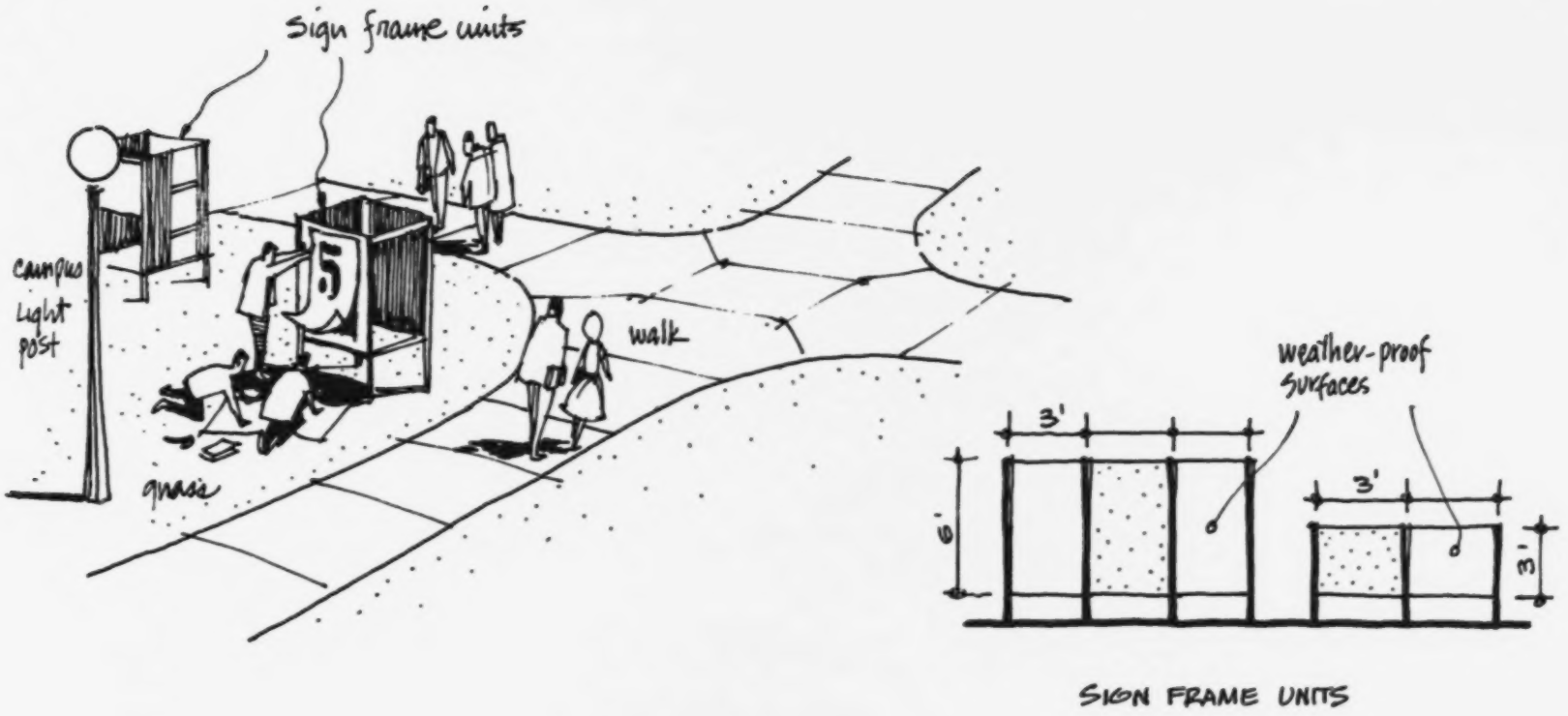
The several types already existing on campus seem to give adequate variety. Rather than introduce any new types for new locations, it would be best to choose from among the existing types. Within each type there is considerable latitude for varying design and detail but care should be taken to avoid too many variations.



INFORMATION CENTER

Permanent supports for these signs should be located at multiple walk intersections, in sub-campus centers, plazas, and near theatres, auditoriums and other such gathering spots.

KIOSK

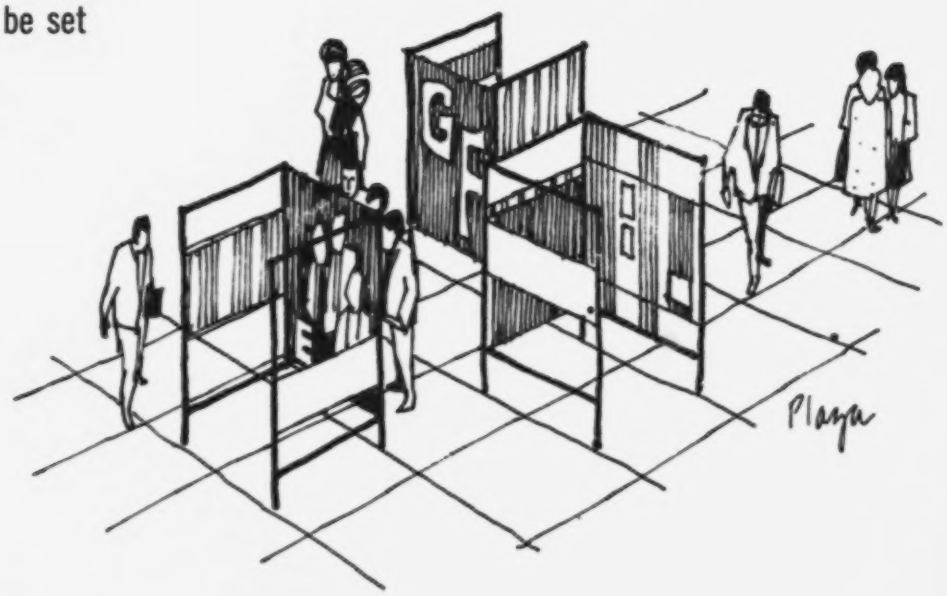


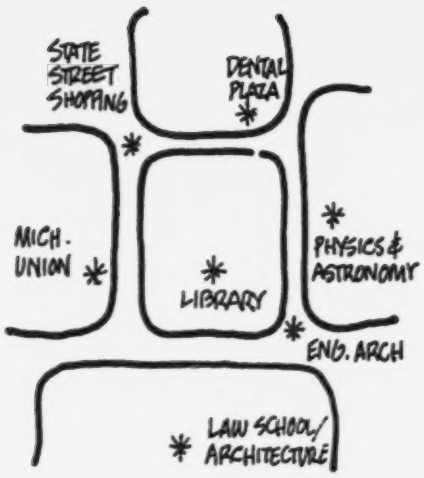
SIGN FRAME UNITS

TEMPORARY SUPPORTS. Temporary, highly flexible and mobile sign frames are needed during certain times of the year when student sign making activity is high. A metal frame system (such as "Unistrut") with a standard modular dimension would serve this purpose well. These could be placed at random along walks, near plazas, in quadrangles, etc. Student groups could choose the desired location and attach the desired announcements.

Permanent sleeves should be positioned in grassed areas to receive the modular frame system, controlling its position and protecting the lawn areas.

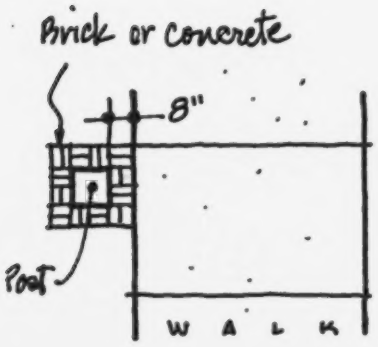
Although a few of the units may be in use on campus throughout the year the major portion would be set out by the University according to demand.



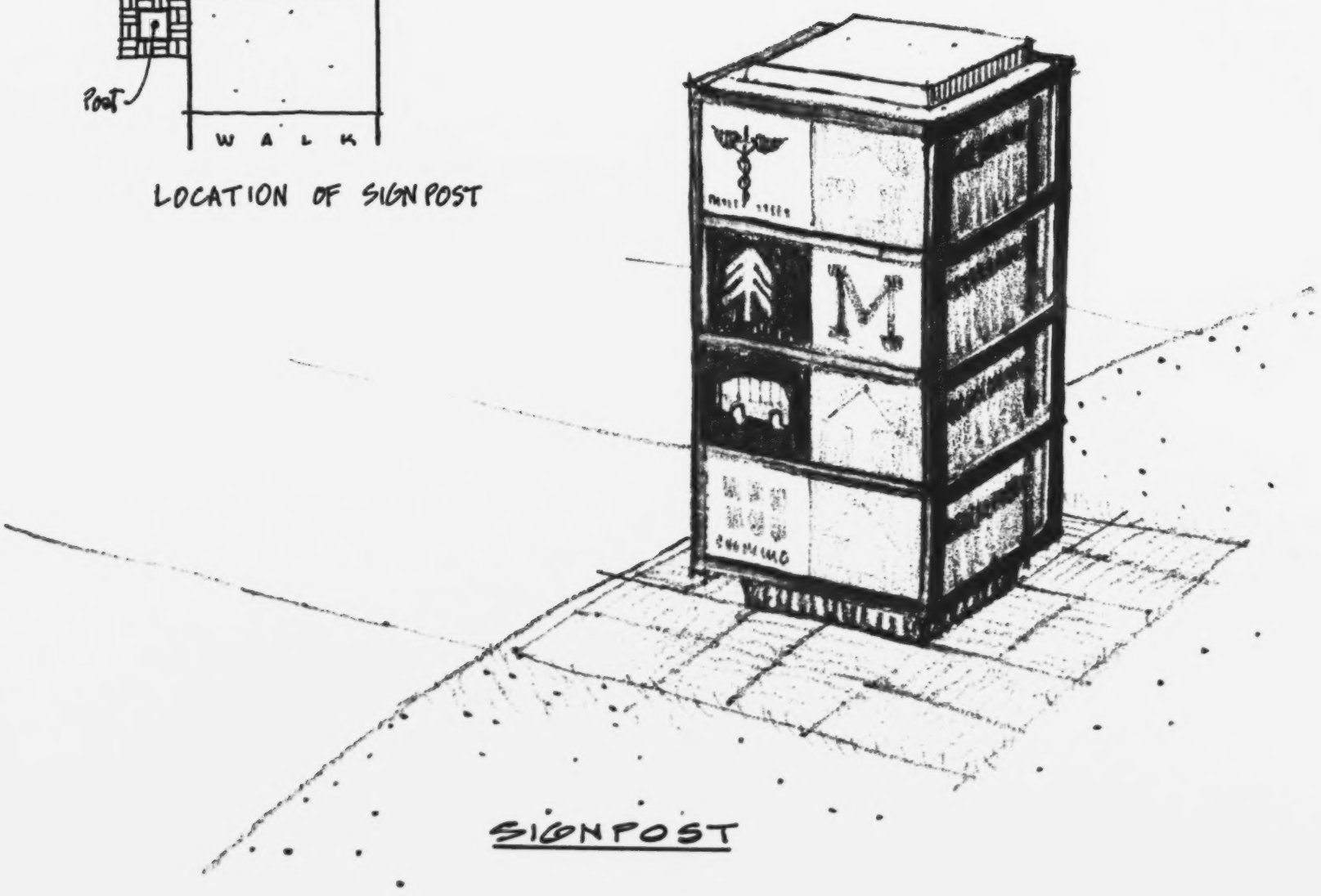


CENTRAL CAMPUS:
TYPICAL LOCATIONS FOR MAJOR DIRECTIONAL SIGNS

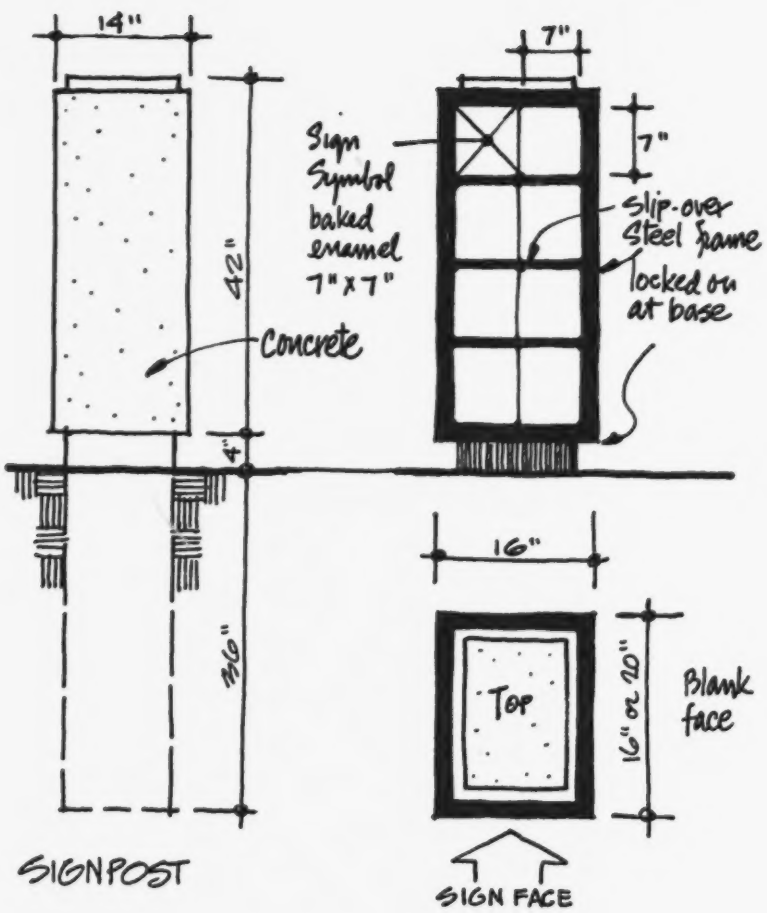
DIRECTIONAL SIGNS. Direction and location signs are needed for guiding visitors and students to the major sections of The University of Michigan campus. These signs should occur only on selected major walkway routes in order to avoid a clutter of too many campus signs. The suggested signing herein has been developed out of a broader campus signs study.



LOCATION OF SIGN POST

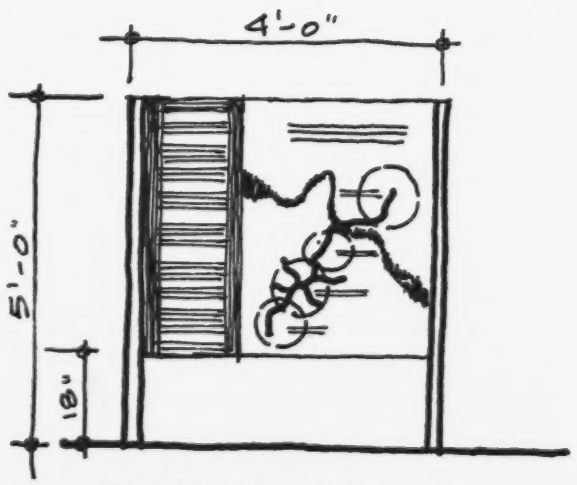


SIGN POST



Two basic elements are involved: a sign post and a campus walkway map. The sign post is composed of a concrete column 42″ high over which fits a metal frame holding square modular sign symbols. The symbols are color keyed to direct pedestrians toward major campus areas, i.e. Central Campus, Medical Center, North Campus, shopping areas and athletic areas. This sign post should occur at frequent intervals along the selected major walkways.

The campus walkway map is a color keyed map to show the overall distribution of campus areas and the layout of the major connecting walkways, bus routes and stops. This map should occur only at occasional major walk intersections, special campus centers and near parking structures so as to be readily available to the visitor.



CAMPUS WALKWAY MAP
(baked enamel - color keyed to sign symbols)

Lighting

Walkway lighting fixtures should continue to be of two basic types:

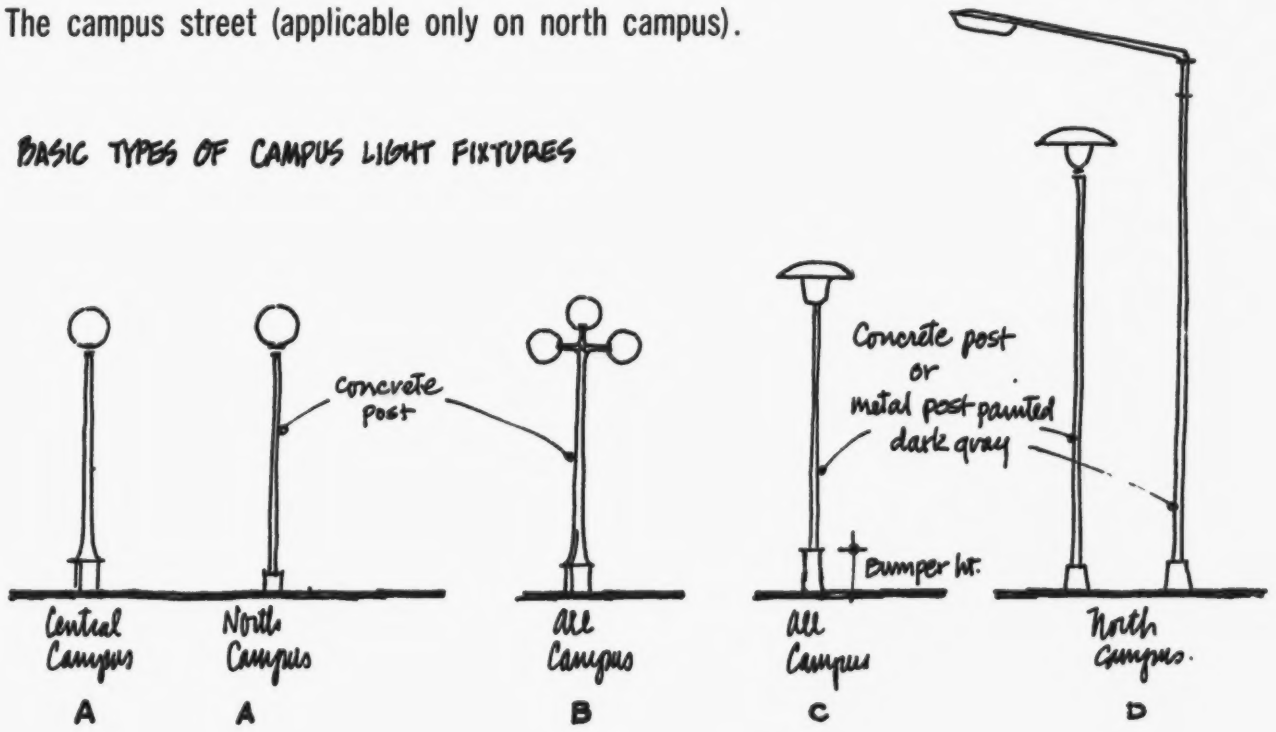
A. A simple light post which is placed at intervals along the walkways and

B. A cluster of lights (either a cluster of globes on one post or a cluster of single globe posts) to mark a special place.

The next order of lighting which should be considered is:

C. The parking lot and

D. The campus street (applicable only on north campus).

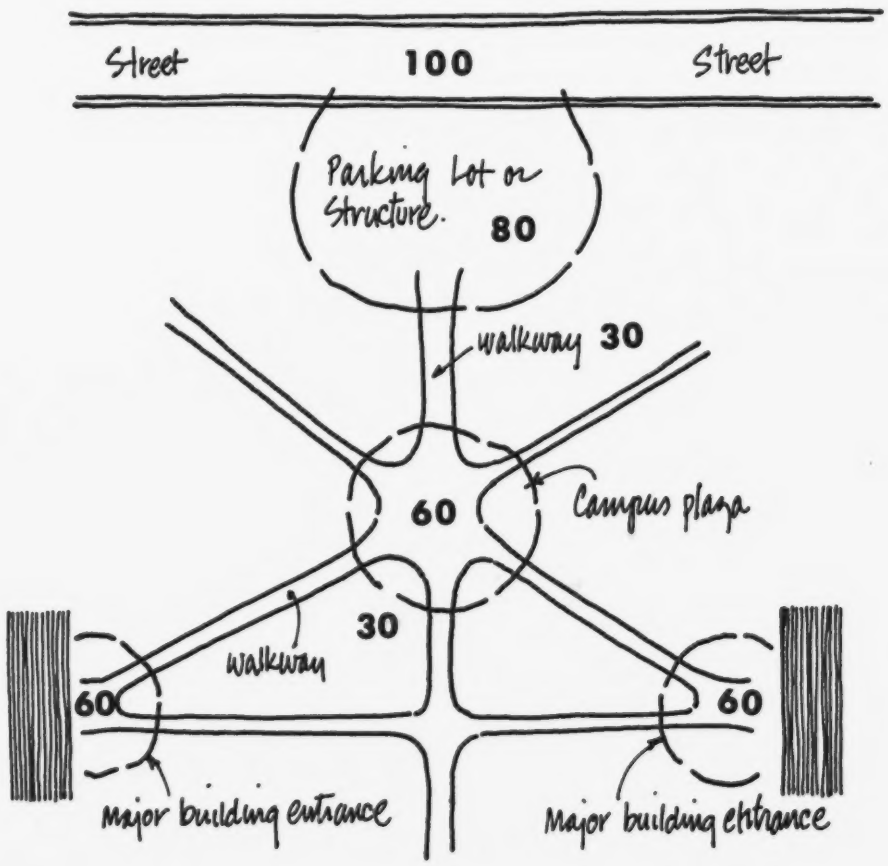


The Central Campus, Medical Center and stadium areas can adapt well to the "Martha Washington" standards with revised round globe for type A, and the globe cluster for type B. (The cluster can be seen at the League and Union entrances although some refinement towards a simpler design is in order). A taller hooded light fixture with concrete or painted metal post (type C) is recommended for parking lots although small parking and service areas should use the walkway fixture to avoid excessive variety. Street lighting is to be consistent with city standards.

The design intent of the globe fixture is to illuminate the underside of tree canopies along walkways, as well as the walking surface, adding another dimension of environmental quality to the campus. Because this esthetic quality is not appropriate to parking lots and because there is no "ceiling" to illuminate, the more efficient mushroom fixture is specified for them. Wherever possible, the taller overhanging street lights should be restricted to areas where a background of trees helps to provide proper scale. Lower street lights are preferred in the more open campus areas.

While this report does not recommend the use of spun aluminum posts presently existing on North Campus, it does recognize the investment involved and suggests their replacement with recommended types and relocation to outlying campus areas that do not usually relate to the general campus scene.

The diagram illustrates desirable light intensities of the various campus zones.



RELATIVE LIGHT INTENSITY INDEX FOR VARIOUS CAMPUS ZONES.

100 = brightest illumination

NOTE: For an example on campus of a "30" light index see Forest Ave. side of Museum addition.

In general, light standards along walks should be placed consistently on one side of a walkway. When the walk is straight the posts should be exactly in line. The tendency is to install too many light fixtures and any proposed pattern of light fixtures should be carefully field checked for final location and number of fixtures.

Where special areas are lighted, post locations should take an appropriate geometric form, carefully balanced to avoid chaotic night-time patterns.

Bicycles

The bicycle is not quite a motor vehicle, nor is the rider a pedestrian. Although it belongs neither to the street nor to the sidewalk, the bicycle uses both. Proposals to sort out the bicycle from vehicular and pedestrian traffic are made ineffective by the numerous intersections created by a third circulation system. Because the distances are relatively short and the desired routings coincident with pedestrian movement, a separate system for bicycles on the campus would cause more confusion and require more control than can be justified.

The growing use of motorbikes emphasizes the problems involved. Would the motorbike be permitted to use a designated bicycle route? If so, the intersection problems become acute. If not, could sufficient control be applied to prevent its entering the bicycle circulation system? It seems, therefore, desirable to assign the motorbike to the street, and permit the bicycle to travel on street or campus walk as it wishes.

Still, some sort of bicycle control is necessary to contribute to the order and efficiency of the campus. An effective control is available through the planned location of its parking facilities. By restricting bicycle parking from specified campus areas, and encouraging the use of planned routings through generous provision of parking places along them, a substantial degree of control can be realized.

In accordance with this concept, bicycle patterns that seem adaptable to the Ann Arbor situation are as follows:

1. Campus-to-campus routes (see route map). Along the indicated alignments, provide for the accommodation of bicycles through additional width of sidewalk and streets.

2. Limit the frequency of use of bicycles within the interior of the Central Campus, Medical Center and North Campus by removing all provisions for bicycle parking from pedestrian precincts within them and placing generous parking lots about the edges of these precincts.

3. Incorporate the principles of the concept into specific bicycle parking regulations and provide adequate enforcement procedures to assure general respect of the intent.

In addition, consideration should be given to reducing the number of types of devices used on campus for bicycle storage to two or several types that provide stability, security, flexibility of location, economy of initial and maintenance costs and aesthetic contribution to the campus environment. Because none of the existing devices provide all of these considerations, new ideas will need to be explored and evaluated. These should include both the floor and free-standing bracket types.

The attempt to standardize parking devices should not eliminate the opportunity for unique solutions designed integrally with architectural projects (such as slotted walls) provided they meet the criteria of security, stability, and attractiveness.

POTENTIAL MAJOR BICYCLE ROUTES

THE UNIVERSITY OF MICHIGAN